Information is Different Now That You’re a Doctor

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Disclosures/Conflict of Interest

• None
Session Objectives

• Describe the central role that data and information play in the practice of medicine
• Discuss how information becomes different when you are a medical professional, from the need to ascertain its quality and efficient retrieval to how it is accessed and utilized by patients
• Explain the key issues for data science and data analytics in medicine
• Describe the discipline of clinical informatics and its role in medicine

Reading Assignment:

Hersh and Ehrenfeld, *Clinical Informatics*, Chapter 9 in *Health Systems Science* (Skochelak et al., 2017)
Information and the new medical student (Shortliffe, 2010)

**William Hersh, MD**

When I first meet with preclinical medical students, I make a point of asking them what they believe will receive the greatest focus of their attention once they are in clinical practice. The most common response, not surprisingly, is patients, and yet it is clear to experienced practitioners that the correct answer is information—in the service of their patients. The need for information underlies essentially all clinical work: the questions asked during a patient history, the tests ordered, the books read, and the questions asked of colleagues. A key correlate to information is knowledge, that elusive concept that justifies all the years of education and training, and that provides the background sense of what is true that allows gathering and interpreting information appropriately. Clinicians often start with data (eg, “Mr Jones' creatinine is 5.2 mg/dL”), those individual elements that combine to allow a synthesis of observations with what is known in order to create summary statements of information (eg, “Mr Jones has renal failure”).

Most of you are “digital natives” but

- Your relationship with information changes as you become a healthcare professional
- You become responsible not only for “knowing” information, but also
  - Using it to provide better care of patients
  - Leveraging it to improve the healthcare system
  - Protecting privacy and confidentiality of patients
  - Acting professionally with information
- Computer literacy is a prerequisite, not an end
Question

- What percentage of time does the average physician spend directly interacting with patients?
  1. Occasionally
  2. Less than half
  3. More than half
  4. Doctors never do anything but take care of patients

Even before computers, more time spent with information than patients

- Time studies of physicians (as early as 1973) show physicians historically spend about
  - 15-55% of their time in direct patient care
  - 45-67% of their time in indirect patient care, divided between reviewing results, performing documentation, and engaging in communication

- More recent studies show
  - 40-60% of time spent interacting with computers – probably too much, how much is the right amount?

Why do physicians spend so much time with information?

• Growth of medical knowledge
  – 75 new clinical trials and 11 systematic reviews published each day
    • To say nothing of the basic science, especially genomics
  – Medical knowledge no longer the exclusive purview of physicians; 80% of all Internet users have searched for personal health information

  • Bastian, 2010; Fox, 2013

Why so much time (cont.)?

• Rapid growth of electronic health record (EHR) adoption
  – As result of “meaningful use” financial incentives of the Health Information for Technology and Clinical Health (HITECH) Act, there has been widespread adoption and use of the EHR, growing to
    • 96% of hospitals
    • 87% of physician offices

  • Henry, 2016; ONC, 2016
Many problems in healthcare have information-related solutions

• Quality – not as good as it could be; slightly more than half of patients get care they should get
• Safety – errors cause morbidity and mortality; many preventable
• Cost – rising costs slowing, but US still spends more and gets less
• Inaccessible information – missing information frequent in primary care

* McGlynn, 2003; Schoen, 2009; NCQA, 2010; Kohn, 2000; Classen, 2011; van den Bos, 2011; Smith, 2012; Angrisano, 2007; Brill, 2013; Hartman, 2015; Smith, 2005

Question

• How many patients die each error due to medical errors?
  1. None; doctors and the healthcare system are so well-trained that they never make errors
  2. A small amount from mostly a few incompetent physicians
  3. 48,000-96,000
  4. Millions
EHR is more than “charting”

• Physicians must be able to
  – Move from one vendor system to another
  – Effectively use clinical decision support to remind us to things to do and warn us about things not to do
  – Access information from other settings where patient received care through health information exchange
  – Apply data analytics, especially in setting of population health management, to achieve quality, safety, and cost-effectiveness

  • Sittig, 2008; Kuperman, 2011; Hersh, 2014

Patients want more from us too

• Growing numbers of patients want to interact with healthcare the way they interact with airlines, retailers, banks, etc.
  – Test results, prescription refills, scheduling, etc.
• Many healthcare systems offer access to personal health record (PHR)
  – Growing number of systems offer access to notes (OpenNotes Project) and more (Apple Health)

  • Miller, 2009; Delbanco, 2010; Woods, 2013
Those who pay for care want more accountability from us

- Purchasers (employers, government) and payors (insurers) want assurance that care provided is proper and cost-effective
  - *Clinical decision support* aims to help physicians make best choices and avoid errors
  - Growing use of *quality measurement and improvement*

We also have responsibilities around information

- Patients expect us to keep their information private and secure
  - *Health Insurance Portability and Accountability Act* (HIPAA) regulations guide our actions
    *Treatment, payment, and operations (TPO) allowed*
    *Other uses require patient to consent*
- Our public-facing persona must be professional, especially on social media
What you can expect in your MD studies at OHSU (Hersh, 2014; Hersh, 2017)

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Advances in Medical Education and Practice

Beyond information retrieval and electronic health record use: competencies in clinical informatics for medical education

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Abstract. Physicians in the 21st century will increasingly interact in diverse ways with information systems, necessitating competencies in specific areas of clinical information. In recent years, medical school curricula have adapted content to incorporate notions of electronic health records (EHR) and their role in the health care system. However, the move from paper to electronic systems is an ongoing process, and curriculum development is needed to ensure in-depth training.

Table 6.2 Competencies in Clinical Informatics for Health Care Professionals

- 1. Plan, select, and apply knowledge based on information for patient care and other clinical tasks
- 2. Information retrieval: Choose and use appropriate search tools, search strategies, and display formats
- 3. Evaluate information resources (e.g., literature, databases) for quality, safety, and accuracy
- 4. Access, retrieve, and use information from patient databases
- 5. Enter, retrieve, and use information from clinical decision support systems
- 6. Establish and maintain patient confidentiality
- 7. Identify and manage access to affect patient care
- 8. Use information technology to manage patient safety
- 9. Document patient care, using clear, concise, accurate, and secure methods
- 10. Participate in research and evidence-based practice

Question

- In 2015, how many Americans suffered a breach of their clinical information?
  1. None, clinical information is always highly secure
  2. Just a few hundred, due to a few careless individuals
  3. 100 million
  4. The entire US population

William Hersh, MD
Information is Different - 8/31/18
Pause:

The Apple Health app now allows patients to download a substantial portion of their medical record from participating provider organizations.

Should OHSU participate in this program?

EHR also allows many re-uses of patient data

• Use data to improve care delivery
• Healthcare quality measurement and improvement
• Clinical and translational research
• Precision medicine
• Public health surveillance
  • Safran, 2007
Implementing the *learning health system*

- Unlike other industries (e.g., aviation), medicine does not learn as well from its mistakes
  - Need to move away from culture of blame
  - Many problems based on systems, not individuals
- Growing amount of clinical data in EHR and other systems allow us to learn and improve
  - Can only be done with high-quality and usable information

Importance of information goes beyond the EHR

- *Professionalism* – proper use of social media and other public sources of information
- *Telemedicine/telehealth* – providing care when separated by time and/or distance from patients
- *Clinical and translational research* – advancing the knowledge base of medicine
- *Precision medicine* – tailoring diagnosis and treatment more precisely, especially around the patient’s genome
Built on a foundation of data

- **Data analytics** – “extensive use of data, statistical and quantitative analysis ... to drive decisions and actions”
  - *Big Data* – the four Vs: volume, velocity, variety, and variability
  - *Data science* – “science of learning from data”

- **Leading to a new paradigm of science?**
  - Making the scientific method obsolete, i.e., no need for experimentation any more?
  - Not really; many caveats for research use of clinical data

- **Growing use of machine learning** – application of computer systems and algorithms that learn from data
  - Radiology – chest x-rays
  - Ophthalmology – retinal images
  - Dermatology – skin lesions
  - Pathology – breast cancer slides

- Davenport, 2007; NIST, 2015; Hersh, 2018; Hey, 2009; Anderson, 2007; Donoho, 2015; Crown, 2015; Gulshan, 2016; Esteva, 2017; Liu, 2017

Clinical informatics

- Part of larger *biomedical and health informatics*, the field concerned with the optimal use of information, often aided by technology, to improve
  - Individual health
  - Healthcare
  - Public health
  - Biomedical research

- Hersh, 2009; Kulikowski, 2012
Fundamental theorem of informatics

Goal of informatics is

(F + 📜) > 🧠

Goal is not

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Friedman, 2009

Clinical informatics

- Competence required of all; career opportunities available for some
- Growing number of physicians work in roles such as Chief Medical Informatics Officer (CMIO) or others in academia or industry
  - Clinical informatics is now a subspecialty of all medical specialties
- OHSU is a national leader in research and education; MD informatics curriculum probably more advanced than any other medical school
  - http://www.ohsu.edu/informatics

- Hersh, 2010; Detmer, 2014; Hersh, 2017
What can you do?

• Informatics skills are essential to the practice of the 21st century physician
  – You should master informatics just as you master any other clinical skill
• For those interested as a career, plenty of opportunities in medical school and beyond
  – Scholarly projects, electives, and more
  – Advanced study – e.g., graduate degree and/or fellowship
  – Clinical informatics subspecialty

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Thank you.
Questions?